

SEQUENCE LISTING

<110> Rosanne M. Crooke
Mark J. Graham

<120> ANTISENSE MODULATION OF APOLIPOPROTEIN(A) EXPRESSION

<130> ISPH-0595

<140>

<141>

<160> 41

<170> FastSEQ for Windows Version 4.0

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<223> Antisense Oligonucleotide

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<210> 2

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<213> Artificial Sequence

<220>

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<210> 3

<211> 13938

<212> DNA

<213> Homo sapiens

<220>

<221> CDS

<222> (46)...(13692)

<400> 3

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Glu Val Val Leu Leu Leu Leu Phe Leu Lys Ser Ala Ala Pro Glu
5 10 15 20

caa agc cat gtg gtc cag gat tgc tac cat ggt gat gga cag agt tat 153

Gln Ser His Val Val Gln Asp Cys Tyr His Gly Asp Gly Gln Ser Tyr	25	30	35	
cga ggc acg tac tcc acc act gtc aca gga agg acc tgc caa gct tgg	201			
Arg Gly Thr Thr Ser Thr Thr Val Thr Gly Arg Thr Cys Gln Ala Trp	40	45	50	
tca tct atg aca cca cat caa cat aat agg acc aca gaa aac tac cca	249			
Ser Ser Met Thr Pro His Gln His Asn Arg Thr Thr Gln Asn Tyr Pro	55	60	65	
aat gct ggc ttg atc atg aac tac tgc agg aat cca gat gct gtg gca	297			
Asn Ala Gly Leu Ile Met Asn Tyr Cys Arg Asn Pro Asp Ala Val Ala	70	75	80	
gct cct tat tgt tat acg agg gat ccc ggt gtc agg tgg gag tac tgc	345			
Ala Pro Tyr Cys Tyr Thr Arg Asp Pro Gly Val Arg Trp Glu Tyr Cys	85	90	95	100
aac ctg acg caa tgc tca gac gca gaa ggg act gcc gtc gcg cct ccg	393			
Asn Leu Thr Gln Cys Ser Asp Ala Glu Gly Thr Ala Val Ala Pro Pro	105	110	115	
act gtt acc ccg gtt cca agc cta gag gct cct tcc gaa caa gca ccg	441			
Thr Val Thr Pro Val Pro Ser Leu Glu Ala Pro Ser Glu Gln Ala Pro	120	125	130	
act gag caa agg cct ggg gtg cag gag tgc tac cat ggt aat gga cag	489			
Thr Glu Gln Arg Pro Gly Val Gln Glu Cys Tyr His Gly Asn Gly Gln	135	140	145	
agt tat cga ggc aca tac tcc acc act gtc aca gga aga acc tgc caa	537			
Ser Tyr Arg Gly Thr Tyr Ser Thr Thr Val Thr Gly Arg Thr Cys Gln	150	155	160	
gct tgg tca tct atg aca cca cac tcg cat agt cgg acc cca gaa tac	585			
Ala Trp Ser Ser Met Thr Pro His Ser His Ser Arg Thr Pro Glu Tyr	165	170	175	180
tac cca aat gct ggc ttg atc atg aac tac tgc agg aat cca gat gct	633			
Tyr Pro Asn Ala Gly Leu Ile Met Asn Tyr Cys Arg Asn Pro Asp Ala	185	190	195	
gtg gca gct cct tat tgt tat acg agg gat ccc ggt gtc agg tgg gag	681			
Val Ala Ala Pro Tyr Cys Tyr Thr Arg Asp Pro Gly Val Arg Trp Glu	200	205	210	
tac tgc aac ctg acg caa tgc tca gac gca gaa ggg act gcc gtc gcg	729			
Tyr Cys Asn Leu Thr Gln Cys Ser Asp Ala Glu Gly Thr Ala Val Ala	215	220	225	
cct ccg act gtt acc ccg gtt cca agc cta gag gct cct tcc gaa caa	777			
Pro Pro Thr Val Thr Pro Val Pro Ser Leu Glu Ala Pro Ser Glu Gln	230	235	240	
gca ccg act gag caa agg cct ggg gtg cag gag tgc tac cat ggt aat	825			
Ala Pro Thr Glu Gln Arg Pro Gly Val Gln Glu Cys Tyr His Gly Asn				

245		250		255		260	
gga cag agt tat	cga ggc aca tac	tcc acc act gtc	aca gga aga acc	873			
Gly Gln Ser Tyr	Arg Gly Thr Tyr	Ser Thr Thr Val	Thr Gly Arg Thr				
	265	270	275				
tgc caa gct tgg	tca tct atg aca	cca cac tcg cat	agt cgg acc cca	921			
Cys Gln Ala Trp	Ser Ser Met Thr	Pro His Ser His	Ser Arg Thr Pro				
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gaa tac tac cca	aat gct ggc ttg	atc atg aac tac	tgc agg aat cca	969			
Glu Tyr Tyr Pro	Asn Ala Gly Leu	Ile Met Asn Tyr	Cys Arg Asn Pro				
	295	300	305				
gat gct gtg gca	gct cct tat tgt	tat acg agg gat	ccc ggt gtc agg	1017			
Asp Ala Val Ala	Ala Pro Tyr Cys	Tyr Thr Arg Asp	Pro Gly Val Arg				
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Trp Glu Tyr Cys	Asn Leu Thr Gln	Cys Ser Asp Ala	Glu Gly Thr Ala				
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Glu Gln Ala Pro	Thr Glu Gln Arg	Pro Gly Val Gln	Glu Cys Tyr His				
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ggt aat gga cag	agt tat cga ggc	aca tac tcc acc	act gtc aca gga	1209			
Gly Asn Gly Gln	Ser Tyr Arg Gly	Thr Tyr Ser Thr	Thr Val Thr Gly				
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aga acc tgc caa	gct tgg tca tct	atg aca cca cac	tcg cat agt cgg	1257			
Arg Thr Cys Gln	Ala Trp Ser Ser	Met Thr Pro His	Ser His Ser Arg				
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acc cca gaa tac	tac cca aat gct	ggc ttg atc atg	aac tac tgc agg	1305			
Thr Pro Glu Tyr	Tyr Pro Asn Ala	Gly Leu Ile Met	Asn Tyr Cys Arg				
	405	410	415				
aat cca gat gct	gtg gca gct cct	tat tgt tat acg	agg gat ccc ggt	1353			
Asn Pro Asp Ala	Val Ala Ala Pro	Tyr Cys Tyr Thr	Arg Asp Pro Gly				
	425	430	435				
gtc agg tgg gag	tac tgc aac ctg	acg caa tgc tca	gac gca gaa ggg	1401			
Val Arg Trp Glu	Tyr Cys Asn Leu	Thr Gln Cys Ser	Asp Ala Glu Gly				
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Thr Ala Val Ala	Pro Pro Thr Val	Thr Pro Val Pro	Ser Leu Glu Ala				
	455	460	465				
cct tcc gaa caa	gca ccg act gag	caa agg cct ggg	gtg cag gag tgc	1497			
Pro Ser Glu Gln	Ala Pro Thr Glu	Gln Arg Pro Gly	Val Gln Glu Cys				
	470	475	480				

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Tyr His Gly Asn Gly Gln Ser Tyr Arg Gly Thr Tyr Ser Thr Thr Val	
485 490 495 500	
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Thr Gly Arg Thr Cys Gln Ala Trp Ser Ser Met Thr Pro His Ser His	
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Ser Arg Thr Pro Glu Tyr Tyr Pro Asn Ala Gly Leu Ile Met Asn Tyr	
520 525 530	
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Cys Arg Asn Pro Asp Ala Val Ala Ala Pro Tyr Cys Tyr Thr Arg Asp	
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Pro Gly Val Arg Trp Glu Tyr Cys Asn Leu Thr Gln Cys Ser Asp Ala	
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Glu Gly Thr Ala Val Ala Pro Pro Thr Val Thr Pro Val Pro Ser Leu	
565 570 575 580	
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Glu Ala Pro Ser Glu Gln Ala Pro Thr Glu Gln Arg Pro Gly Val Gln	
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Glu Cys Tyr His Gly Asn Gly Gln Ser Tyr Arg Gly Thr Tyr Ser Thr	
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Thr Val Thr Gly Arg Thr Cys Gln Ala Trp Ser Ser Met Thr Pro His	
615 620 625	
tcg cat agt cgg acc cca gaa tac tac cca aat gct ggc ttg atc atg	1977
Ser His Ser Arg Thr Pro Glu Tyr Tyr Pro Asn Ala Gly Leu Ile Met	
630 635 640	
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Asn Tyr Cys Arg Asn Pro Asp Ala Val Ala Ala Pro Tyr Cys Tyr Thr	
645 650 655 660	
agg gat ccc ggt gtc agg tgg gag tac tgc aac ctg acg caa tgc tca	2073
Arg Asp Pro Gly Val Arg Trp Glu Tyr Cys Asn Leu Thr Gln Cys Ser	
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Asp Ala Glu Gly Thr Ala Val Ala Pro Pro Thr Val Thr Pro Val Pro	
680 685 690	
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Ser Leu Glu Ala Pro Ser Glu Gln Ala Pro Thr Glu Gln Arg Pro Gly	
695 700 705	

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val gln glu cys tyr his gly asn gly gln ser tyr arg gly thr tyr	
710 715 720	
tcc acc act gtc aca gga aga acc tgc caa gct tgg tca tct atg aca	2265
ser thr thr val thr gly arg thr cys gln ala trp ser ser met thr	
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pro his ser his ser arg thr pro glu tyr tyr pro asn ala gly leu	
745 750 755	
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ile met asn tyr cys arg asn pro asp ala val ala ala pro tyr cys	
760 765 770	
tat acg agg gat ccc ggt gtc agg tgg gag tac tgc aac ctg acg caa	2409
tyr thr arg asp pro gly val arg trp glu tyr cys asn leu thr gln	
775 780 785	
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cys ser asp ala glu gly thr ala val ala pro pro thr val thr pro	
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805 810 815 820	
cct ggg gtg cag gag tgc tac cat ggt aat gga cag agt tat cga ggc	2553
pro gly val gln glu cys tyr his gly asn gly gln ser tyr arg gly	
825 830 835	
aca tac tcc acc act gtc aca gga aga acc tgc caa gct tgg tca tct	2601
thr tyr ser thr thr val thr gly arg thr cys gln ala trp ser ser	
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met thr pro his ser his ser arg thr pro glu tyr tyr pro asn ala	
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gly leu ile met asn tyr cys arg asn pro asp ala val ala ala pro	
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tyr cys tyr thr arg asp pro gly val arg trp glu tyr cys asn leu	
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thr gln cys ser asp ala glu gly thr ala val ala pro pro thr val	
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cga ggc	aca tac	tcc acc	act gtc	aca gga	aga acc	tgc caa	gct tgg	2937
Arg Gly	Thr Tyr	Ser Thr	Thr Val	Thr Gly	Arg Thr	Cys Gln	Ala Trp	
	950		955			960		
tca tct	atg aca	cca cac	tcg cat	agt cgg	acc cca	gaa tac	tac cca	2985
Ser Ser	Met Thr	Pro His	Ser His	Ser Arg	Thr Pro	Glu Tyr	Tyr Pro	
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aat gct	ggc ttg	atc atg	aac tac	tgc agg	aat cca	gat gct	gtg gca	3033
Asn Ala	Gly Leu	Ile Met	Asn Tyr	Cys Arg	Asn Pro	Asp Ala	Val Ala	
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gct cct	tat tgt	tat acg	agg gat	ccc ggt	gtc agg	tgg gag	tac tgc	3081
Ala Pro	Tyr Cys	Tyr Thr	Arg Asp	Pro Gly	Val Arg	Trp Glu	Tyr Cys	
	1000			1005		1010		
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Asn Leu	Thr Gln	Cys Ser	Asp Ala	Glu Gly	Thr Ala	Val Ala	Pro Pro	
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agt tat	cga ggc	aca tac	tcc acc	act gtc	aca gga	aga acc	tgc caa	3273
Ser Tyr	Arg Gly	Thr Tyr	Ser Thr	Thr Val	Thr Gly	Arg Thr	Cys Gln	
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Ala Trp	Ser Ser	Met Thr	Pro His	Ser His	Ser Arg	Thr Pro	Glu Tyr	
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Tyr Pro	Asn Ala	Gly Leu	Ile Met	Asn Tyr	Cys Arg	Asn Pro	Asp Ala	
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Val Ala	Ala Pro	Tyr Cys	Thr Thr	Arg Asp	Pro Gly	Val Arg	Trp Glu	
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Pro Pro	Thr Val	Thr Pro	Val Pro	Ser Leu	Glu Ala	Pro Ser	Glu Gln	
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Ala Pro	Thr Glu	Gln Arg	Pro Gly	Val Gln	Glu Cys	Tyr His	Gly Asn	

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Glu Cys Tyr His Gly Asn Gly Gln Ser Tyr Arg Gly Thr Tyr Ser Thr	
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Ser Leu Glu Ala Pro Ser Glu Gln Ala Pro Thr Glu Gln Arg Pro Gly	
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tat tgt tat acg agg gat ccc ggt gtc agg tgg gag tac tgc aac ctg Tyr Cys Tyr Thr Arg Asp Pro Gly Val Arg Trp Glu Tyr Cys Asn Leu 1800 1805 1810	5481
acg caa tgc tca gac gca gaa ggg act gcc gtc gcg cct ccg act gtt Thr Gln Cys Ser Asp Ala Glu Gly Thr Ala Val Ala Pro Pro Thr Val 1815 1820 1825	5529
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caa agg cct ggg gtg cag gag tgc tac cat ggt aat gga cag agt tat	5625

Gln Arg Pro Gly Val Gln Glu Cys Tyr His Gly Asn Gly Gln Ser Tyr	
1845 1850 1855 1860	
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Arg Gly Thr Tyr Ser Thr Val Thr Gly Arg Thr Cys Gln Ala Trp	
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Ser Ser Met Thr Pro His Ser His Ser Arg Thr Pro Glu Tyr Tyr Pro	
1880 1885 1890	
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Ala Pro Tyr Cys Tyr Thr Arg Asp Pro Gly Val Arg Trp Glu Tyr Cys	
1910 1915 1920	
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Asn Leu Thr Gln Cys Ser Asp Ala Glu Gly Thr Ala Val Ala Pro Pro	
1925 1930 1935 1940	
act gtt acc ccg gtt cca agc cta gag gct cct tcc gaa caa gca ccg	5913
Thr Val Thr Pro Val Pro Ser Leu Glu Ala Pro Ser Glu Gln Ala Pro	
1945 1950 1955	
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Thr Glu Gln Arg Pro Gly Val Gln Glu Cys Tyr His Gly Asn Gly Gln	
1960 1965 1970	
agt tat cga ggc aca tac tcc acc act gtc aca gga aga acc tgc caa	6009
Ser Tyr Arg Gly Thr Tyr Ser Thr Thr Val Thr Gly Arg Thr Cys Gln	
1975 1980 1985	
gct tgg tca tct atg aca cca cac tcg cat agt cgg acc cca gaa tac	6057
Ala Trp Ser Ser Met Thr Pro His Ser His Ser Arg Thr Pro Glu Tyr	
1990 1995 2000	
tac cca aat gct ggc ttg atc atg aac tac tgc agg aat cca gat gct	6105
Tyr Pro Asn Ala Gly Leu Ile Met Asn Tyr Cys Arg Asn Pro Asp Ala	
2005 2010 2015 2020	
gtg gca gct cct tat tgt tat acg agg gat ccc ggt gtc agg tgg gag	6153
Val Ala Ala Pro Tyr Cys Tyr Thr Arg Asp Pro Gly Val Arg Trp Glu	
2025 2030 2035	
tac tgc aac ctg acg caa tgc tca gac gca gaa ggg act gcc gtc gcg	6201
Tyr Cys Asn Leu Thr Gln Cys Ser Asp Ala Glu Gly Thr Ala Val Ala	
2040 2045 2050	
cct ccg act gtt acc ccg gtt cca agc cta gag gct cct tcc gaa caa	6249
Pro Pro Thr Val Thr Pro Val Pro Ser Leu Glu Ala Pro Ser Glu Gln	
2055 2060 2065	
gca ccg act gag caa agg cct ggg gtg cag gag tgc tac cat ggt aat	6297
Ala Pro Thr Glu Gln Arg Pro Gly Val Gln Glu Cys Tyr His Gly Asn	

2070	2075	2080	
gga cag agt tat cga ggc aca tac tcc acc act gtc aca gga aga acc Gly Gln Ser Tyr Arg Gly Thr Tyr Ser Thr Thr Val Thr Gly Arg Thr 2085 2090 2095 2100			6345
tgc caa gct tgg tca tct atg aca cca cac tcg cat agt cgg acc cca Cys Gln Ala Trp Ser Ser Met Thr Pro His Ser His Ser Arg Thr Pro 2105 2110 2115			6393
gaa tac tac cca aat gct ggc ttg atc atg aac tac tgc agg aat cca Glu Tyr Tyr Pro Asn Ala Gly Leu Ile Met Asn Tyr Cys Arg Asn Pro 2120 2125 2130			6441
gat gct gtg gca gct cct tat tgt tat acg agg gat ccc ggt gtc agg Asp Ala Val Ala Ala Pro Tyr Cys Tyr Thr Arg Asp Pro Gly Val Arg 2135 2140 2145			6489
tgg gag tac tgc aac ctg acg caa tgc tca gac gca gaa ggg act gcc Trp Glu Tyr Cys Asn Leu Thr Gln Cys Ser Asp Ala Glu Gly Thr Ala 2150 2155 2160			6537
gtc gcg cct ccg act gtt acc ccg gtt cca agc cta gag gct cct tcc Val Ala Pro Pro Thr Val Thr Pro Val Pro Ser Leu Glu Ala Pro Ser 2165 2170 2175 2180			6585
gaa caa gca ccg act gag caa agg cct ggg gtg cag gag tgc tac cat Glu Gln Ala Pro Thr Glu Gln Arg Pro Gly Val Gln Glu Cys Tyr His 2185 2190 2195			6633
ggt aat gga cag agt tat cga ggc aca tac tcc acc act gtc aca gga Gly Asn Gly Gln Ser Tyr Arg Gly Thr Tyr Ser Thr Thr Val Thr Gly 2200 2205 2210			6681
aga acc tgc caa gct tgg tca tct atg aca cca cac tcg cat agt cgg Arg Thr Cys Gln Ala Trp Ser Ser Met Thr Pro His Ser His Ser Arg 2215 2220 2225			6729
acc cca gaa tac tac cca aat gct ggc ttg atc atg aac tac tgc agg Thr Pro Glu Tyr Tyr Pro Asn Ala Gly Leu Ile Met Asn Tyr Cys Arg 2230 2235 2240			6777
aat cca gat gct gtg gca gct cct tat tgt tat acg agg gat ccc ggt Asn Pro Asp Ala Val Ala Ala Pro Tyr Cys Tyr Thr Arg Asp Pro Gly 2245 2250 2255 2260			6825
gtc agg tgg gag tac tgc aac ctg acg caa tgc tca gac gca gaa ggg Val Arg Trp Glu Tyr Cys Asn Leu Thr Gln Cys Ser Asp Ala Glu Gly 2265 2270 2275			6873
act gcc gtc gcg cct ccg act gtt acc ccg gtt cca agc cta gag gct Thr Ala Val Ala Pro Pro Thr Val Thr Pro Val Pro Ser Leu Glu Ala 2280 2285 2290			6921
cct tcc gaa caa gca ccg act gag caa agg cct ggg gtg cag gag tgc Pro Ser Glu Gln Ala Pro Thr Glu Gln Arg Pro Gly Val Gln Glu Cys 2295 2300 2305			6969

cat	ggt	aat	gga	cag	agt	tat	cga	ggc	aca	tac	tcc	acc	act	gtc	7017	
Tyr	His	Gly	Asn	Gly	Gln	Ser	Tyr	Arg	Gly	Thr	Tyr	Ser	Thr	Thr		Val
2310 2315 2320																
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Thr	Gly	Arg	Thr	Cys	Gln	Ala	Trp	Ser	Ser	Met	Thr	Pro	His	Ser	His	
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Ser	Arg	Thr	Pro	Glu	Tyr	Tyr	Pro	Asn	Ala	Gly	Leu	Ile	Met	Asn	Tyr	
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Cys	Arg	Asn	Pro	Asp	Ala	Val	Ala	Ala	Pro	Tyr	Cys	Tyr	Thr	Arg	Asp	
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Pro	Gly	Val	Arg	Trp	Glu	Tyr	Cys	Asn	Leu	Thr	Gln	Cys	Ser	Asp	Ala	
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Glu	Gly	Thr	Ala	Val	Ala	Pro	Pro	Thr	Val	Thr	Pro	Val	Pro	Ser	Leu	
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Glu	Ala	Pro	Ser	Glu	Gln	Ala	Pro	Thr	Glu	Gln	Arg	Pro	Gly	Val	Gln	
2405 2410 2415 2420																
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Glu	Cys	Tyr	His	Gly	Asn	Gly	Gln	Ser	Tyr	Arg	Gly	Thr	Tyr	Ser	Thr	
2425 2430 2435																
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Thr	Val	Thr	Gly	Arg	Thr	Cys	Gln	Ala	Trp	Ser	Ser	Met	Thr	Pro	His	
2440 2445 2450																
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Ser	His	Ser	Arg	Thr	Pro	Glu	Tyr	Tyr	Pro	Asn	Ala	Gly	Leu	Ile	Met	
2455 2460 2465																
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Asn	Tyr	Cys	Arg	Asn	Pro	Asp	Ala	Val	Ala	Ala	Pro	Tyr	Cys	Tyr	Thr	
2470 2475 2480																
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Arg	Asp	Pro	Gly	Val	Arg	Trp	Glu	Tyr	Cys	Asn	Leu	Thr	Gln	Cys	Ser	
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Asp	Ala	Glu	Gly	Thr	Ala	Val	Ala	Pro	Pro	Thr	Val	Thr	Pro	Val	Pro	
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Ser	Leu	Glu	Ala	Pro	Ser	Glu	Gln	Ala	Pro	Thr	Glu	Gln	Arg	Pro	Gly	
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tgc tca gac gca gaa ggg act gcc gtc gcg cct ccg act gtt acc ccg Cys Ser Asp Ala Glu Gly Thr Ala Val Ala Pro Pro Thr Val Thr Pro 2615 2620 2625	7929
gtt cca agc cta gag gct cct tcc gaa caa gca ccg act gag cag agg Val Pro Ser Leu Glu Ala Pro Ser Glu Gln Ala Pro Thr Glu Gln Arg 2630 2635 2640	7977
cct ggg gtg cag gag tgc tac cac ggt aat gga cag agt tat cga ggc Pro Gly Val Gln Glu Cys Tyr His Gly Asn Gly Gln Ser Tyr Arg Gly 2645 2650 2655 2660	8025
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tat tgt tat acg agg gat ccc ggt gtc agg tgg gag tac tgc aac ctg Tyr Cys Tyr Thr Arg Asp Pro Gly Val Arg Trp Glu Tyr Cys Asn Leu 2710 2715 2720	8217
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acc ccg gtt cca agc cta gag gct cct tcc gaa caa gca ccg act gag Thr Pro Val Pro Ser Leu Glu Ala Pro Ser Glu Gln Ala Pro Thr Glu 2745 2750 2755	8313
caa agg cct ggg gtg cag gag tgc tac cat ggt aat gga cag agt tat	8361

Gln Arg Pro Gly Val Gln Glu Cys Tyr His Gly Asn Gly Gln Ser Tyr	
2760	2765
2770	
cga ggc aca tac tcc acc act gtc aca gga aga acc tgc caa gct tgg	8409
Arg Gly Thr Tyr Ser Thr Thr Val Thr Gly Arg Thr Cys Gln Ala Trp	
2775	2780
2785	
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Ser Ser Met Thr Pro His Ser His Ser Arg Thr Pro Glu Tyr Tyr Pro	
2790	2795
2800	
aat gct ggc ttg atc atg aac tac tgc agg aat cca gat gct gtg gca	8505
Asn Ala Gly Leu Ile Met Asn Tyr Cys Arg Asn Pro Asp Ala Val Ala	
2805	2810
2815	2820
gct cct tat tgt tat acg agg gat ccc ggt gtc agg tgg gag tac tgc	8553
Ala Pro Tyr Cys Tyr Thr Arg Asp Pro Gly Val Arg Trp Glu Tyr Cys	
2825	2830
2835	
aac ctg acg caa tgc tca gac gca gaa ggg act gcc gtc gcg cct ccg	8601
Asn Leu Thr Gln Cys Ser Asp Ala Glu Gly Thr Ala Val Ala Pro Pro	
2840	2845
2850	
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Thr Val Thr Pro Val Pro Ser Leu Glu Ala Pro Ser Glu Gln Ala Pro	
2855	2860
2865	
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Thr Glu Gln Arg Pro Gly Val Gln Glu Cys Tyr His Gly Asn Gly Gln	
2870	2875
2880	
agt tat cga ggc aca tac tcc acc act gtc aca gga aga acc tgc caa	8745
Ser Tyr Arg Gly Thr Tyr Ser Thr Thr Val Thr Gly Arg Thr Cys Gln	
2885	2890
2900	
gct tgg tca tct atg aca cca cac tcg cat agt cgg acc cca gaa tac	8793
Ala Trp Ser Ser Met Thr Pro His Ser His Ser Arg Thr Pro Glu Tyr	
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2915	
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Tyr Pro Asn Ala Gly Leu Ile Met Asn Tyr Cys Arg Asn Pro Asp Ala	
2920	2925
2930	
gtg gca gct cct tat tgt tat acg agg gat ccc ggt gtc agg tgg gag	8889
Val Ala Ala Pro Tyr Cys Tyr Thr Arg Asp Pro Gly Val Arg Trp Glu	
2935	2940
2945	
tac tgc aac ctg acg caa tgc tca gac gca gaa ggg act gcc gtc gcg	8937
Tyr Cys Asn Leu Thr Gln Cys Ser Asp Ala Glu Gly Thr Ala Val Ala	
2950	2955
2960	
cct ccg act gtt acc ccg gtt cca agc cta gag gct cct tcc gaa caa	8985
Pro Pro Thr Val Thr Pro Val Pro Ser Leu Glu Ala Pro Ser Glu Gln	
2965	2970
2975	2980
gca ccg act gag cag agg cct ggg gtg cag gag tgc tac cac ggt aat	9033
Ala Pro Thr Glu Gln Arg Pro Gly Val Gln Glu Cys Tyr His Gly Asn	

2985										2990										2995																			
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Gly	Gln	Ser	Tyr	Arg	Gly	Thr	Tyr	Ser	Thr	Thr	Val	Thr	Gly	Arg	Thr																								
3000										3005										3010																			
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Cys	Gln	Ala	Trp	Ser	Ser	Met	Thr	Pro	His	Ser	His	Ser	Arg	Thr	Pro																								
3015										3020										3025																			
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3030										3035										3040																			
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Asp	Ala	Val	Ala	Ala	Pro	Tyr	Cys	Tyr	Thr	Arg	Asp	Pro	Gly	Val	Arg																								
3045										3050										3055										3060									
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Trp	Glu	Tyr	Cys	Asn	Leu	Thr	Gln	Cys	Ser	Asp	Ala	Glu	Gly	Thr	Ala																								
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3095										3100										3105																			
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Gly	Asn	Gly	Gln	Ser	Tyr	Arg	Gly	Thr	Tyr	Ser	Thr	Val	Thr	Gly																									
3110										3115										3120																			
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3125										3130										3135										3140									
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Thr	Pro	Glu	Tyr	Tyr	Pro	Asn	Ala	Gly	Leu	Ile	Met	Asn	Tyr	Cys	Arg																								
3145										3150										3155																			
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Asn	Pro	Asp	Ala	Val	Ala	Ala	Pro	Tyr	Cys	Tyr	Thr	Arg	Asp	Pro	Gly																								
3160										3165										3170																			
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3175										3180										3185																			
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Thr	Ala	Val	Ala	Pro	Pro	Thr	Val	Thr	Pro	Val	Pro	Ser	Ser	Leu	Glu	Ala																							
3190										3195										3200																			
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Pro	Ser	Glu	Gln	Ala	Pro	Thr	Glu	Gln	Arg	Pro	Gly	Val	Gln	Glu	Cys																								
3205										3210										3215										3220									

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agt cgg acc cca gaa tac tac cca aat gct ggc ttg atc atg aac tac Ser Arg Thr Pro Glu Tyr Tyr Pro Asn Ala Gly Leu Ile Met Asn Tyr 3255 3260 3265	9849
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ccc ggt gtc agg tgg gag tac tgc aac ctg acg caa tgc tca gac gca Pro Gly Val Arg Trp Glu Tyr Cys Asn Leu Thr Gln Cys Ser Asp Ala 3285 3290 3295 3300	9945
gaa ggg act gcc gtc gcg cct ccg act gtt acc ccg gtt cca agc cta Glu Gly Thr Ala Val Ala Pro Pro Thr Val Thr Pro Val Pro Ser Leu 3305 3310 3315	9993
gag gct cct tcc gaa caa gca ccg act gag cag agg cct ggg gtg cag Glu Ala Pro Ser Glu Gln Ala Pro Thr Glu Gln Arg Pro Gly Val Gln 3320 3325 3330	10041
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Arg Gly Ser Phe Ser Thr Val Thr Gly Arg Thr Cys Gln Ser Trp	
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Ser Ser Met Thr Pro His Trp His Gln Arg Thr Thr Glu Tyr Tyr Pro	
3705 3710 3715	
aat ggt ggc ctg acc agg aac tac tgc agg aat cca gat gct gag att	11241
Asn Gly Gly Leu Thr Arg Asn Tyr Cys Arg Asn Pro Asp Ala Glu Ile	
3720 3725 3730	
agt cct tgg tgt tat acc atg gat ccc aat gtc aga tgg gag tac tgc	11289
Ser Pro Trp Cys Tyr Thr Met Asp Pro Asn Val Arg Trp Glu Tyr Cys	
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Asn Leu Thr Gln Cys Pro Val Thr Glu Ser Ser Val Leu Ala Thr Ser	
3750 3755 3760	
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Thr Ala Val Ser Glu Gln Ala Pro Thr Glu Gln Ser Pro Thr Val Gln	
3765 3770 3775 3780	
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Asp Cys Tyr His Gly Asp Gly Gln Ser Tyr Arg Gly Ser Phe Ser Thr	
3785 3790 3795	
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Thr Val Thr Gly Arg Thr Cys Gln Ser Trp Ser Ser Met Thr Pro His	
3800 3805 3810	
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Trp His Gln Arg Thr Thr Glu Tyr Tyr Pro Asn Gly Gly Leu Thr Arg	
3815 3820 3825	
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Asn Tyr Cys Arg Asn Pro Asp Ala Glu Ile Arg Pro Trp Cys Tyr Thr	
3830 3835 3840	
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Met Asp Pro Ser Val Arg Trp Glu Tyr Cys Asn Leu Thr Gln Cys Pro	
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Val Met Glu Ser Thr Leu Leu Thr Thr Pro Thr Val Val Pro Val Pro	
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Ser Thr Glu Leu Pro Ser Glu Glu Ala Pro Thr Glu Asn Ser Thr Gly	
3880 3885 3890	
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Val Gln Asp Cys Tyr Arg Gly Asp Gly Gln Ser Tyr Arg Gly Thr Leu	

3895	3900	3905	
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cca cat tgg cat cgg agg atc cca tta tac tat cca aat gct ggc ctg Pro His Trp His Arg Arg Ile Pro Leu Tyr Tyr Pro Asn Ala Gly Leu 3925 3930 3935 3940			11865
acc agg aac tac tgc agg aat cca gat gct gag att cgc cct tgg tgt Thr Arg Asn Tyr Cys Arg Asn Pro Asp Ala Glu Ile Arg Pro Trp Cys 3945 3950 3955			11913
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